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Declaration

I, Michihiko Matsuba, President of Fukuyama Sangyo Honyaku Center, Ltd., of 16-3, 2-chome, Nogami-cho, Fukuyama, Japan, do solemnly and sincerely declare that I understand well both the Japanese and English languages and that the attached document in English is a full and faithful translation, of the copy of Japanese Unexamined Patent No. Hei-8-43910 laid open on February 16, 1996.

A handwritten signature in black ink, appearing to read "m. matsuba", with a stylized flourish at the end.

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CAMERA MOUNTING STRUCTURE

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Applicant: Kyocera Corporation

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SPECIFICATION

TITLE OF THE INVENTION

Camera Mounting Structure

[ABSTRACT]

[Themes] To provide a camera mounting structure enabling the respective functions to be securely joined and the connecting structure to be compact in a lens interchangeable range finder type autofocus camera.

[Structure] By inserting an interchangeable lens 2 into a mount 11 of a camera body from a predetermined position, a lens-side electric contact pad 21 is press-fitted to a camera-side electric contact pin 9, and at the same time, a lens driving coupler 8 is coupled to a focus ring coupler 50. Further, upon

moving rotationally a spigot ring 12, an engagement pin 19 moves a finder interlocking pin 15 in the circumferential direction of the lens barrel only by the degree corresponding to the focal length of the interchangeable lens 2, thereby allowing a finder angle of view setting mechanism 18 to operate so that the magnifying power of a range finder 3 is adjusted. A bayonet pawl 20 is locked at a bayonet pawl locking part 17 and an engagement groove 22 of the spigot ring 12 is locked on the lens lock lever 14, thereby fixing the interchangeable lens 2. Slightly before the interchangeable lens 2 is fixed, a lens mounting SW lever is operated and lens mounting is detected.

WHAT IS CLAIMED IS;

[Claim 1] A camera mounting structure in an autofocus camera, which is lens interchangeable and including a range finder changes magnifying power in accordance with the focal length of an interchangeable lens, comprising;

a mount which is a reference plane of flange focus on the camera-side,

bayonet pawl locking parts consecutively provided in the mount,

a finder interlocking pin coupled with a finder angle of view setting mechanism and movable in the circumferential direction of the lens barrel,

a lens driving coupler for transmitting driving force of the motor to carry out autofocusing, etc.,

a camera-side electric connecting part for transmitting data, such as focal point data, and

a lens mounting SW lever for detecting lens mounting, and, further, the interchangeable lens comprising,

a spigot ring including a bayonet pawl locked at the bayonet pawl locking part and an engagement pin engaged with the finder interlocking pin,

a lens-side electric connecting part connected to the camera-side electric connecting part, and

a focus ring coupler joined with the lens driving coupler, wherein

the interchangeable lens is fitted into the mount from a predetermined position, thereby connecting the lens-side electric connecting part with the camera-side electric connecting part, at the same time, thereby coupling the lens driving coupler to the focus ring coupler, and the spigot ring is rotationally moved, thereby allowing the engagement pin to push the finder interlocking pin in the circumferential direction of the lens barrel by the degree corresponding to the focal length of the interchangeable lens so as to adjust the magnifying power of the finder angle of view setting

mechanism, at the same time, the bayonet pawl is locked at the bayonet pawl locking part and the lens mounting SW lever is operated, thereby detecting the mounting of the interchangeable lens.

[DETAILED DESCRIPTION OF THE INVENTION]

[0001]

[Field of the Invention] The present invention relates to a mounting structure of an autofocus camera, of which the lens is interchangeable, including a range finder adjusted to the magnifying power in accordance with a type (angle of view) of the interchangeable lens.

[0002]

[Prior Arts] Recently, autofocusing has been generally adopted to single-lens reflex cameras, in accordance with the adoption, enlargement of a camera body and the mounting part has become noticeable. In a case where a lens interchanging system is adopted to an autofocus compact camera, data or driving force must be transmitted between the camera body and lens side from each other as in the case of single-lens reflex cameras. In addition, in range finder system cameras, a factor in which the camera mount itself becomes large is included, since the finder angle of view must automatically vary in accordance with the focal length of the lens to be attached and the number of

joining positions at which the respective functions of the camera body and lens side increases more than a single-lens reflex camera, thereby making the connecting structure complicated. On the other hand, downsizing of a range finder type autofocus compact camera has always been demanded.

[0003]

[Themes to be Solved by the Invention] An object of the present invention is to provide, in a lens interchangeable range finder type autofocus camera, a camera mounting structure enabling the respective functions to be securely joined and the connecting structure to be compact.

[0004]

[Means for Solving Themes] To achieve the abovementioned purpose, the camera mounting structure according to the present invention, in an autofocus camera which is lens interchangeable and including a range finder which varies the magnifying power in accordance with the focal length of the interchangeable lens, comprising, a mount which is a reference plane of flange focus on the camera-side,

bayonet pawl locking parts consecutively provided in the mount,

a finder interlocking pin coupled to a finder angle of view setting mechanism and movable in the circumferential direction

of the lens barrel,

a lens driving coupler for transmitting driving force of the motor to carry out autofocusing, etc.,

a camera-side electric connecting part for transmitting data, such as focal point data, and

a lens mounting SW lever for detecting lens mounting, and, further, the interchangeable lens comprising,

a spigot ring including a bayonet pawl locked at the bayonet pawl locking part and an engagement pin engaged with the finder interlocking pin,

a lens-side electric connecting part connected to the camera-side electric connecting part, and

a focus ring coupler connected with the lens driving coupler, the camera mounting structure is constructed in such a manner that the interchangeable lens is fitted into the mount from a predetermined position, thereby connecting the lens-side electric connecting part with the camera-side electric connecting part, at the same time, thereby coupling the lens driving coupler to the focus ring coupler, and the spigot ring is rotationally moved, thereby allowing the engagement pin to push the finder interlocking pin in the circumferential direction of the lens barrel by the degree corresponding to the focal length of the interchangeable lens so as to adjust

the magnifying power of the finder angle of view setting mechanism, at the same time, the bayonet pawl is locked at the bayonet pawl locking part and the lens mounting SW lever is operated, thereby detecting the mounting of the interchangeable lens.

[0005]

[Action] According to the above-described structure, the respective functions can be securely connected and the mounting portion becomes compact.

[0006]

[Preferred Embodiment] The present invention will be described in detail with reference to the drawings. Fig. 1 is a perspective view for showing the external appearance of a lens interchangeable range finder autofocus camera adopting the mounting structure according to the present invention. On the front surface of the upper cover, a range finder part 3 and a passive autofocus range-finding part 7 are disposed, on the upper surface of the upper cover, a main switch 5, release button 6 and focus dial 4 are disposed. The interchangeable lens 2 is detachably provided in the camera body 1. At the lower part of the mount 11 of the camera, a camera-side electric contact pin 9 and lens driving coupler 8 are provided. In addition, at the right side of the mount 11, a lens detachable

button 10 for detaching the lens is disposed. On the other hand, an interchangeable lens 2 is provided with a spigot ring 12 so as to rotate by a predetermined angle.

[0007] The connecting parts of the other functions in the vicinity of the mount are omitted in Fig. 1, and these parts are shown in detail in Fig. 2. Fig. 2 is a front view showing an embodiment of the camera mounting structure according to the present invention. At the inner side of the mount 11, four bayonet pawl locking parts 17a, 17b, 17c, and 17d are consecutively provided. The mount 11 is fixed to the camera body with screws at four screw holes 14a, 14b, 14c, and 14d. A finder interlocking pin 15 is provided at the mount inner side between the bayonet pawl locking parts 17a and 17d, and can be engaged with an engagement pin 19 (refer to Fig. 3) described later. The finder interlocking pin 15 is movable in the circumferential direction of the lens barrel.

[0008] In the vicinity of one end of the bayonet pawl locking part 17d, a lens positioning pin 16 which is a mark at the position to which the lens is mounted is planted. At the mount inner side between the bayonet pawl locking parts 17a and 17b, a lens lock lever 14 to which a charging force is applied in the lower direction on the paper (in front of you on the paper) is disposed. The lens lock lever 14 is movable to the upper

side on the paper against the charging force by pressing the lens detachable button 10. The camera-side electric contact pin 9 provided in the vicinity of the lower part of the mount is configured in such a manner that charging force is applied in the lower direction on the paper (in front of you on the paper) and the camera-side electric contact pin 9 becomes dented by being pressed by the later-described lens-side electric contact pad 21 (refer to Fig. 3). At the rear side of the bayonet pawl locking part 17b, a lens mounting SW lever 13 is disposed.

[0009] Fig. 3 is a view for explaining a connecting state of each function for the camera body and the interchangeable lens. The mounting structure of the present invention will be described with reference to Fig. 4 through Fig. 7. The interchangeable lens 2 is inserted into the mount 11 while positioning by the lens positioning pin 16, and the spigot ring 12 is rotationally moved, thereby the bayonet pawl 20 is locked at the bayonet pawl locking part 17 and the interchangeable lens is mounted. At this time, the engagement pin 19 provided on the spigot ring 12 moves the finder interlocking pin 15 in the circumferential direction of the lens barrel by the degree corresponding to the focal length of the interchangeable lens. By the movement of the finder interlocking pin 15, the angle

of view of the finder angle of view setting mechanism 18 is adjusted, whereby the magnifying power of the range finder part 3 is changed.

[0010] Figs. 4 are views showing details of the finder angle of view setting mechanism, respectively, (a) is a front view and (b) is a side view. The gear plate 31 in which the finder interlocking pins 15 are planted is provided in a bottom board 36 slidably in the right direction. The gear plate 31 is applied a charging force in the left direction by the spring 35 and the rack part 31a is engaged with the gear 32. The gear 32 is engaged with the gear 33 and, further, coupled to the rack part 34d of the cam plate 34. By pressing the engagement pin 19 from the left side of the finder interlocking pin 15 by the degree corresponding to the focal length of the interchangeable lens, the gear plate 31 moves in the right direction against the charging force of the spring 35. Whereby a cam plate 34 also moves in the right direction.

[0011] Fig. 5 is a view showing details of a range finder optical system of which the angle of view can be changed by the finder angle of view setting mechanism. The cam plate 34 includes a long groove 34a, 34b and 34c. The finder objective lens 38 is comprised of a plurality of lens groups, and the respective lens groups are supported by lens frames 42, 43, and 44. Pins

42a, 43a, and 44a planted in the lens frames 42, 43, and 44 are engaged with the long grooves 34a, 34b, and 34c, respectively. Light from a subject through an objective lens 38 reaches to an eyepiece lens 39 through a condenser lens and pentaprism 40. When the cam plate 34 moves in the right direction, the long grooves 34a, 34b, and 34c also move in the right direction, whereby the respective lens frames move in the direction perpendicular to the moving direction of the cam plate 34 and the objective lens 38 is adjusted to the magnifying power corresponding to the focal length of the interchangeable lens.

[0012] In Fig.1 and Fig. 3, when the interchangeable lens 2 positioned by the lens positioning pin 16 is inserted, the lens-side electric contact pad 21 is pressure contacted and electrically coupled to the camera-side electric contact pin 9. In addition, the focus ring coupler 50 is coupled to the lens driving coupler 8. At the camera-side, the CPU (control circuit) 29 carries out arithmetic processing for focus controls and carries out other controls necessary for the camera. With the CPU 29, voltage values from infinite to point blank of autofocus or manual focus by the operation of the focus dial 4 is indicated. A lens side circuit 23 in the interchangeable lens 2 is comprised of a lens type judgement

signal output circuit and flange focus compensation signal output circuit. The lens type judgement signal output circuit outputs voltage (voltages corresponding to a wide angle lens, standard lens, and telephoto lens, etc.,) corresponding to the focal length (angle of view) of the interchangeable lens. The flange focus compensation signal output circuit outputs a flange focus compensation signal at the time of focus control for fine adjustment of flange focus.

[0013] The abovementioned lens type judgement signal and flange focus compensation signal are sent to the CPU 29 via the lens-side electric contact pad 21 and the camera-side electric contact pin 9. The CPU 29 judges which type of lens is mounted by the voltage value of the lens type judgement signal and reads out lens data corresponding to the interchangeable lens from a nonvolatile memory 30. The CPU 29 calculates the motor driving pulse number for bringing the focus ring 51 from the lens standard position to the focusing position. Additionally, in the manual focus mode, based on the length information set by the focus dial 4, the motor driving pulse number is calculated similarly. The CPU 29 controls the motor driving circuit 28 to rotate the motor 27 so as to reduce speed by the reduction gear group 26, and rotates the focus ring 51 via the focus ring coupler 50 so as to advance and retreat the lens. The

interchangeable lens 2 is provided with a lens code substrate 24, and the lens brush contact slides in accordance with the rotation of the focus ring 51 on the code pattern of the lens code substrate 24, thereby the cord corresponding to the focus ring position is sent to the CPU 29 via the lens-side electric contact pad 21 and the camera-side electric contact pin 9.

[0014] Figs. 6 are views for showing details of the lens lock mechanism, respectively, (a) is a front view and (b) is a side view. The lens detachable button 10 is provided on the lens lock lever bottom board 46, and the periphery is covered by the lens lock decorative ring 45. The lens lock lever 14 is coupled to the lens detachable button 10 so as to be pressed below by pressing down the lens detachable button 10. When rotating the spigot ring 12 by a predetermined angle, the lens lock lever 14 is engaged with the engagement groove 22. When removing the lens, upon pressing the lens detachable button 10, the lens lock lever 14 is released from the engagement groove 22 of the spigot ring so that the spigot ring 12 can rotate counterclockwise.

[0015] Fig. 7 is a view for showing details of the mechanism part for detecting the lens mounting. The lens mounting SW lever 13 is rotatably attached to the axis 47. The one end of the lens mounting SW lever 13 is applied a charging force clockwise

by the spring 48 and presses the projecting part 49c formed in such a manner that a contact terminal 49b of the switch 49 is extended. Therefore, the contact terminal 49b contacts with another contact terminal 49a, causing the switch 49 to be in a turned-on state. The spigot ring 12 rotates and impinges the other end of the lens mounting SW lever 13 slightly before the stopping position. After impinging, when the spigot ring 12 rotates by the angle to be interlocked, the lens mounting SW lever 13 rotates counterclockwise, the switch 49 is turned off and the lens mounting is detected.

[0016]

[Effects of the Invention] According to the present invention as described above, in a lens interchangeable range finder autofocus camera, a mounting structure to which the respective functions are securely joined to each other and a compact connecting structure can be realized.

BRIEF DESCRIPTION OF THE DRAWINGS

[Fig. 1] A perspective view showing the external appearance of an autofocus range finder camera to which the mounting structure according to the present invention is adopted.

[Fig. 2] A front view showing an embodiment of a camera mounting structure.

[Fig. 3] An explanatory view of a joining structure of the

respective functions on the camera-side and interchangeable lens side.

[Fig. 4] Views showing details of a finder angle of view setting mechanism, (a) is a front view and (b) is a side view.

[Fig. 5] A view showing details of a range finder optical system.

[Fig. 6] Views showing details of a lens lock mechanism part, (a) is a front view, and (b) is a side view.

[Fig. 7] A view showing details of the mechanism for detecting the lens mounting.

[Description of Symbols]

- 1 Camera body
- 2 Interchangeable lens
- 3 Range finder part
- 4 Focus dial
- 5 Main switch
- 6 Release button
- 7 Passive range-finding part
- 8 Lens driving coupler
- 9 Camera-side electric contact pin
- 10 Lens detachable button
- 11 Mount
- 12 Spigot ring

13 Lens mounting SW lever
14 Lens lock lever
15 Finder interlocking pin
16 Lens positioning pin
17 Bayonet pawl locking part
18 Finder angle of view setting mechanism
19 Engagement pin
20 Bayonet pawl
21 Lens-side electric contact pad
22 Engagement groove
23 Lens-side circuit
24 Lens code substrate
25 Encoder
26 Reduction gear group
27 Motor
28 Motor driving circuit
29 CPU
30 Nonvolatile memory
31 Gear plate
32, 33 gears
34 Cam plate
35 Spring
36 Bottom board

38 Finder objective lens
39 Eyepiece lens
40 Pentaprism
41 Mirror
42, 43, 44 Lens frames
45 Lens lock decorative ring
46 Lens lock lever bottom board
47 Axis
48 Spring
49 Switch

Fig.1

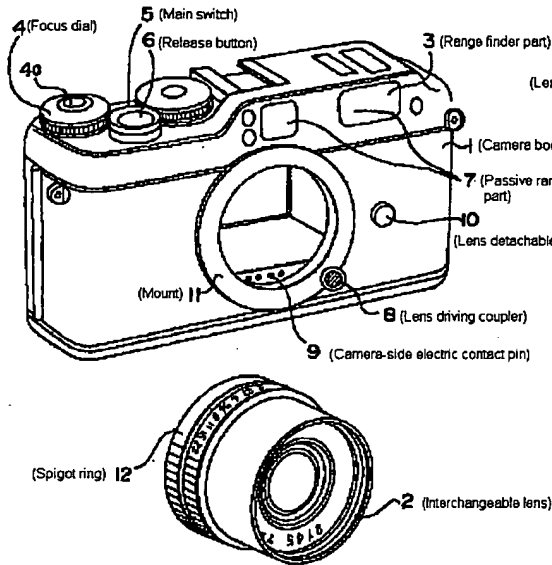
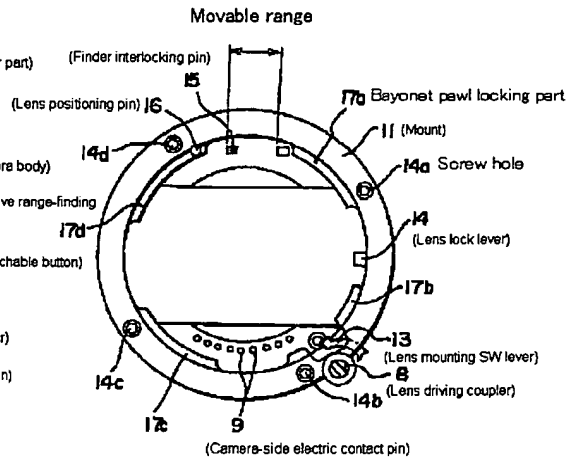


Fig.2



4a:Auto focus/Manual focus switching button

Fig.3

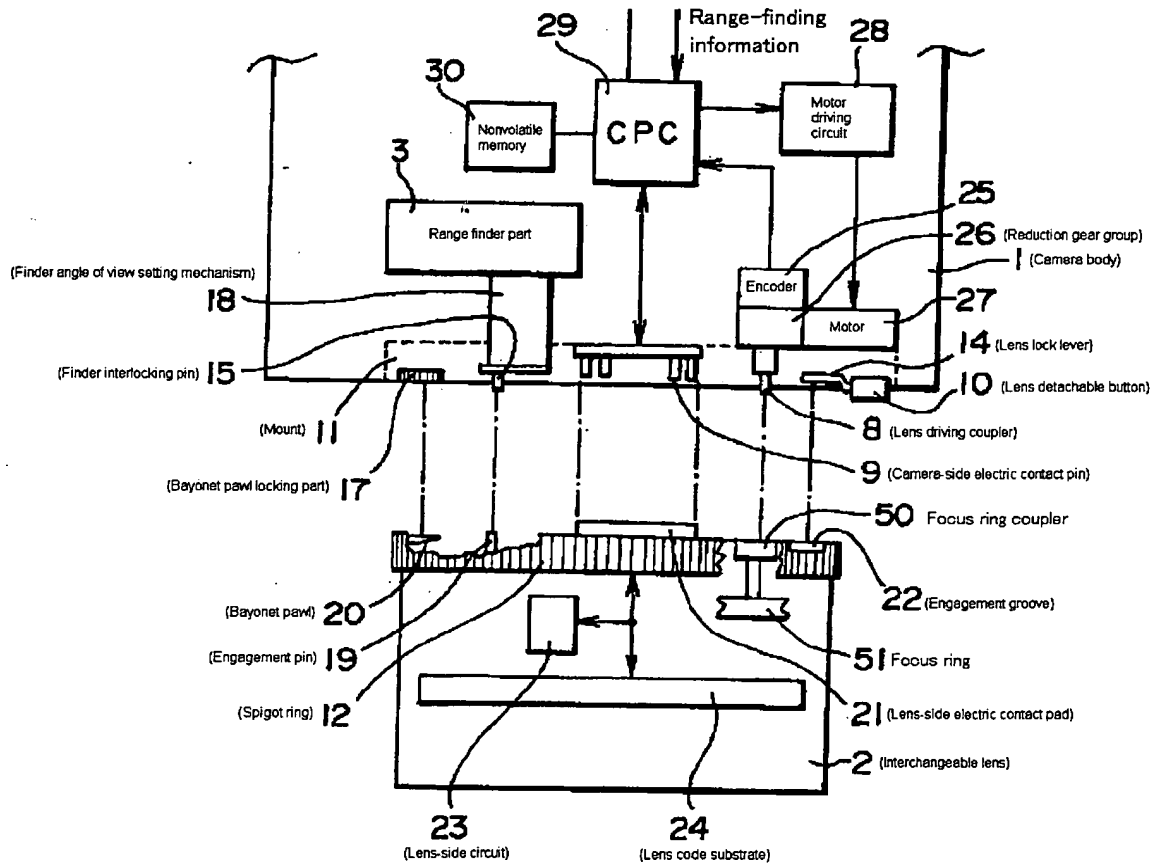


Fig.4

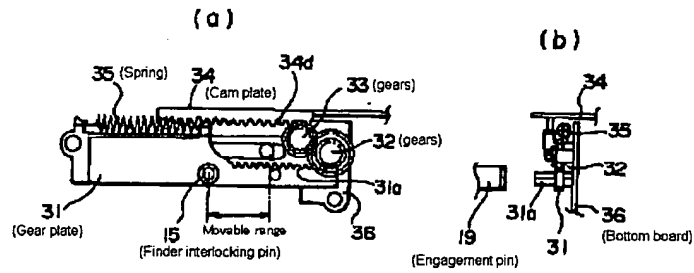


Fig.5

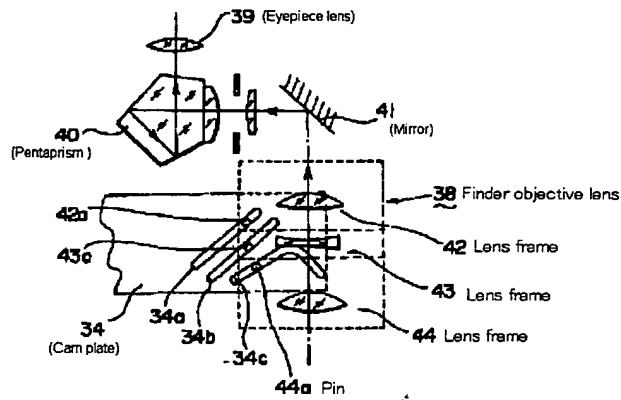


Fig.7

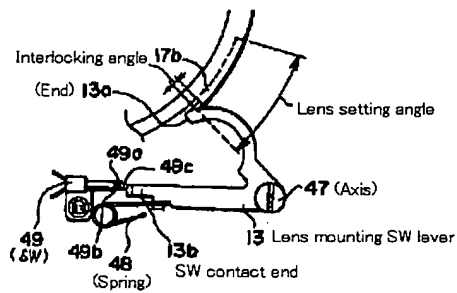


Fig.6

